SATISFACTION OF OXYGEN THERAPY PILOT PROJECT IN TWO DISTRICT HOSPITALS, SAVANNAKHET PROVINCE, LAO PDR

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ABSTRACT: This study aimed to describe the satisfaction level of patient's care takers and health care workers related to oxygen therapy in a pilot project in two district hospitals, Savannakhet province, Lao PDR. Qualitative and quantitative methods were used. A quantitative cross-sectional study was used to describe satisfaction in patients' care takers. Qualitative in-depth interviews and walk-through observation was used to describe satisfaction in health care workers. Data were collected from January to April 2014 and included 50 patient's care takers and 3 health care workers from two district hospitals. The study revealed that overall the majority of patient's care takers were satisfied with oxygen therapy provided by health care workers in two district hospitals with 80% satisfied and 20% with neutral (few satisfied). Some issues, as re-using nasal prongs, led to dissatisfaction among patient's care taker with 62.5% satisfied. Among patient's care takers work as a farmer was positive associated with satisfaction (*p-value* < 0.05). Health care workers were satisfied with the oxygen therapy pilot project, especially, with the oxygen concentrator, and even with some minor problems with low flow of oxygen and alarm sounds. Through the investigators' direct observation, all concentrators and related equipment were functioning and in good maintenance in the hospital. In conclusion, the oxygen therapy pilot project produced satisfaction among patient's care takers and health care workers in both district hospitals because it provided more benefits such as was cost effective and can provide for all patients needed in short term of oxygen therapy in acute respiratory infection like pneumonia, asthma but didn't have elderly patient admitted with long-term of oxygen therapy like COPD while collecting data. All ten concentrators were functioning and regularly used to provide oxygen to patients but as the dust can damage concentrator's function. Dust prevention and regular cleaning of concentrators were required. The oxygen therapy pilot project contributed a lot benefit neither patient and health care worker and it was recommended to expand project to other district hospitals to improve the health care system in Lao PDR.

Keywords: Oxygen therapy, District hospital, Lao PDR

INTRODUCTION

Oxygen therapy is the pilot project in Lao PDR. Therefore, evaluation of project is an important material or process to the organization or donor can use to demonstrate its accountability, improve project performance, increase ability for obtain future planning and funds. This can fulfill the objectives of organization or donor, by communicate the results of evaluation, then project itself can inform to board of director, service user, the public, funders and other stakeholders about the effectiveness and benefits of the programs in conducting evaluation. Conducting the evaluation has many benefit, it will be a waste of the organization's resources if the result of evaluation are not use [1].

The evaluation can contribute and provide information for actions example as strategy planning, decision-making, program modification. The evaluation of project helps to understand the success, process, also the effectiveness, it provides

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you with a comprehensive description of project including: 1. People need to get involved in your project, 2. need project to address, 3. Outcome of project is intended to achieve, 4. Definition of success of your project, 5. Output and Immediate results that you could expect [1]. Evaluating and improving the quality of health care provided essential to investigate [2]. Patients' satisfaction is the significant indicator of quality of care, to improve service or patient care in the health facility, the factors influence on patient satisfaction is importance regard to health care workers in the context of health care [3]. This research aimed to study about patient's care taker satisfied with the health care service in oxygen therapy and health care workers satisfied with the concentrators and oxygen therapy pilot project.

MATERIAL AND METHOD

This study was conducted in Phalanxay and Sepon district hospital, Savannakhat province, Lao PDR. The qualitative and quantitative had applied. Data were collected from January to April 2014.

The cross sectional study design was used to describe the satisfaction of patients' care takers, who child or relative had oxygen therapy. The structure interview questionnaire included information of socio-demographic characteristic, satisfaction of oxygen therapy and patient medical record. Fifty care takers were asked by health care worker from two district hospitals. The satisfaction from care taker had 5 scales (strongly satisfied, satisfied, neutral, dissatisfied and strongly satisfied), then converted to 3 levels by mixing scales. The satisfied score between 52 and 65, neutral score between 27 and 51, dissatisfied score between 13 and 26. Then information was entered in SPSS 16 (University's license). Chi-square was analyzed and looked association factor between education level, occupation, income and outcome of treatment with level of satisfaction among care takers.

In-depth interview was used to explain the satisfaction of health care workers who experienced with concentrator used. The interview guideline was developed for in-depth interview with six health care workers, the hospital director, a general medicine doctor and a nurse in Sepon district hospital and the hospital director, a chief nurse and a nurse in Phalanxay district hospital and interviewed them. In addition, the checklist was used to observe the effective used of the equipment and concentrators Content analysis was used to assess health care workers' satisfaction in pilot project.

All questionnaires developed by researcher and review by expert from WHO, consultant from oxygen pilot project, also professor from College of Public Health, Chulalongkorn University, pre-test had done in hospital at Vientiane capital. Ethical consideration was submitted to Lao National Institute of Public Health, University of Health Science.

RESULTS

A total of 50 questionnaires completed by two district hospitals. There were not big different proportion between male and female (52 and 48%). The majority of patient's care taker age more than 40 year old (38%), most of them got married (94%), 54 % of patient's care takers were farmer and 40 % of them were are illiterate, in one household had family member around 5 to 8 people (68%), the monthly income was between 1,600,000 kip and 3,500,000 kip (38%), compared to monthly expenditure mainly between 1,600,000 kip and 3,500,000 kip (44%). More than half of the participant and their family member hadn't had oxygen therapy before in the last two year (84%), they also had positive thinking with oxygen therapy because 62% of them feel safe when seeing patient had oxygen therapy, but 16% was worry with patient, this might depend on severity of each patient. In the reality oxygen treated by cylinder was expensive in district hospital, but majority of them were willing to pay.

During data collection, the highest percentage of patients admitted to district hospital most likely children age less than 1 year (30%), female was 52%, highest cause of oxygen therapy was acute respiratory diseases (32%), 94% of patients got oxygen by concentrator, 84% of patients were getting better and well recovered, before getting oxygen therapy 66% of patients had SpO_2 less than threshold indicated providing an oxygen therapy , after on oxygen 94% of them increase the SpO_2 level more than threshold (the threshold indicated providing oxygen therapy is SpO2 < 90%, measure with oximetry). Most patients was treated by oxygen less than 1 day (96%), and 88% of patients admitted hospital less than 1 day.

Looking for the satisfaction level of patient's care taker, 94% of them satisfied with the services provided before getting oxygen, 72% satisfied even hospitalize more than 1 days with oxygen therapy, more than half satisfied with the health care workers provided care to their children or relatives, compared to the oxygen equipment, 38% dissatisfied with the reused nasal prong, 88% of then preferred to have new one, after the patient treated with oxygen patient's care takers were

Table 1 Patient's care taker satisfied with the health care service regarding oxygen therapy

How satisfied are you with	Level of satisfaction			Mean, SD, Min and Max value
	Satisfaction n (%)	Neutral n (%)	Dissatisfaction n (%)	
Service provided regarding oxygen therapy				
Process/steps before getting oxygen therapy (e.g. document process…)	47(94)	2(4)	1(2)	Mean= 4.30 SD=0.547, Min=2, max=5
Long term(more than one days) treatment to my children with oxygen	36(72)	9(18)	5(10)	Mean= 3.90 SD=0.931, Min=2, max=5
Health Care Workers(HCWs)				
Service provided oxygen therapy to my children/relative by HCW	46(92)	4(8)	0	Mean= 4.36 SD=0.631, Min=3, max=5
Information were provided before giving oxygen therapy(e.g. HCWs explained the reason why do my child need oxygen therapy)	40(80)	7(14)	3(6)	Mean= 4.00 SD=0.808, Min=2, max=5
Doctor provided oxygen therapy to my children	48(96)	1(2)	1(2)	Mean= 4.40 SD=0.639, Min=2, max=5
Took care my children by HCWs on oxygen therapy	45(90)	3(6)	2(4)	Mean= 4.32 SD=0.768, Min=2, max=5
Equipment/facility				
Reused nasal prong with free	19(38)	12(24)	19(38)	Mean= 3.08 SD=1.275, Min=1, max=5
New nasal prong with charge	44(88)	6(12)	0	Mean= 4.32, SD=0.683, Min=3, max=5
All equipment related to oxygen therapy supported treatment for patient (oxygen concentrator, nasal prong…)	47(94)	2(4)	1(2)	Mean= 4.20 SD=0.606, Min=2, max=5
Oxygen system in patient room is satisfactory	48(96)	2(4)	0	Mean= 4.44 SD=0.677, Min=3, max=5
Quality of treatment/outcome				
Oxygen therapy with patients symptoms	47(94)	3(6)	0	Mean= 4.44, SD=0.611, Min=3, max=5
Outcome after received oxygen therapy	47(94)	3(6)	0	Mean= 4.54, SD=0.613, Min=3, max=5
Satisfaction rate by oxygen therapy	48(96)	2(4)	0	Mean= 4.64, SD=0.563, Min=3, max=5

Table 2 overall satisfaction scale in 13 questions

Overall satisfied score		Frequency (%)
Satisfaction score		
Mean=54.94, SD=4.44, Mode=55,	Score 27 – 51	10(20)
min=39, Max=62	Score ≥ 52	40(80)

satisfied with the outcome and improvement of SpO_2. See in the Table 1 and the overall of satisfaction, patient's care takers were satisfied with the service and provider, see Table 2.

To find out factors influencing patient's care taker satisfaction, the socio-demographic characteristic and patient medical record used to find the association with overall satisfaction scale, it showed that 92% of farmer satisfy with the health care service of oxygen therapy with positive significant association (*p-value* =0.028), but income, education level and outcome of treatment did not show significant associations.

In-depth interview

Satisfaction of oxygen concentrator

The result of in-depth interview found thatmost diseases and symptoms leading patient to require oxygen were pneumonia, asthma, cyanosis and accident, both in children and elderly people, three health care workers used oximeter to decide whether or not giving oxygen therapy and five in

six of interviewees were satisfied with the result of treatment by concentrator, but all six interviewees were not able to fix, because, they were not trained, no skills on repairing.

Two interviewees had no problem of using and maintenance, other four interviewees consider regular cleaning was difficult, because doctor and nurse had other responsibilities, therefore, no time to clean, also little concerned from health care worker to clean it.

Four of interviewee satisfied with concentrators, it provided sufficient quality of oxygen, and easy to use. On the other hand, two health care works not satisfied of concentrator's beep sound occur while providing oxygen to patient (beep sound indicated problems with concentrator and need solves it), and low oxygen flow.

Overall project

All of health care workers satisfied with the project such as training on cases management on oxygen used for district health care worker, a good monitoring and repairing team from central and provincial level. The project was advantage for cost-saving and completeness of oxygen therapy, because free of charge. The interviewees said "*after implemented oxygen therapy pilot project in past two years, no case required discharge hospital, after health care workers provided oxygen therapy*" but there were, before oxygen therapy pilot project started, because high cost leaded patient cannot afford oxygen therapy. Other two concerned on repairing broken concentrator. Most of repairing done on central level. This caused delay of repair and use. The other concerning was selection of right persons to be trained and gave responsibilities, that will help project sustainable.

Six interviewees satisfied to continue providing data to project coordinator, and they required extending the project to other poor district hospital, provided more training to old and new staff, continuing supported for nasal prongs and other materials in implementation hospitals.

Walk-through observation

The observation time of concentrators used in two district hospitals, since project implemented, had a different data from each other. In Sepon district hospital, the maximum of concentrator used was 6193 hours, minimum was 192 hours, the total used in six concentrators was 10,386 hours, and the average time used was 5193 hours. In Phlanxay district hospital, the total hour of four concentrators used was 1,263 hours, the average time used was 632 hours, the maximum time was 418 hours, and minimum was 98 hours. Of the concentrators which had been used for less than 200 hours, meant, the concentrators were used between 4 or less than 4 days per year. These concentrators fond in both district hospitals, recently all concentrators were functioning as other equipment such as pulse oximetry, SpO2 sensors but the oxygen flow splitters and tubing was not clean.

DISCUSSION

Patients' care takers

Most of patients' care takers were limited of education, under high school, farmer was main occupation, leading low household income between 1,600,000 - 3,500,000 kip (38%) compared to monthly household expended was same amount as income (44%), and therefore, people still poor. But 89.1% of care takers were willing to pay for oxygen even expensive.

Majority of patients' care takers hadn't been treated with oxygen in the last two years (84%), but more a half had positive thinking and satisfied with the services provided regarding oxygen therapy (76%), health care workers (82%), equipment/facility related to oxygen therapy (60%) and outcome of oxygen therapy (90%), these relevant to other studies that patient mostly satisfaction with the technical aspect of health care worker as high ranked. Patient and care taker usually focused on the competence providers, high standard of diagnosis and treatment [4]. Additional, one study showed, patient to be less satisfied with information provided in the receptionist and other but were not found in this study [5]. The accessibility or convenience also a factor influenced patient or care taker satisfied.

The study result showed occupation of care taker was significant associate with the satisfaction level, actually, farmer was the major occupation. Compared between income and expenditure/month, causes patients was not able seek good treatment, therefore, this might influence this group of occupation significant with satisfaction in district hospital.

Other study mentioned financial consider an important factor to associated with the level of satisfaction, because patients had to pay for service and treatment, but this project was free of oxygen therapy, this might be the reason could not find the association. In a few study, patient tend to be more satisfied when they had insurance. On the other hand, people who had good finical, they might consider better facilities and services, because, hospital, services were properly organized [6].

In theoretical of patient and care taker satisfaction the outcome of treatment indicated to reflect the perception of patients' care takers satisfied with health care provider. This study showed the improvement/recover of patient was not significant associate with the satisfaction (p-value = 0.700), The association between socio-demographic characteristic and the level of satisfaction in patient's care taker had not present significant, but other studies showed the associated of patient satisfaction and socio-demographic [4, 7, 8].

It can be seen these data of patients' care takers differs in different health facilities, health care service provided or difference expectation of care taker, these might be factor did not find association [6].

Oxygen concentrator and satisfaction with concentrator

Five in six of interviewees satisfied with results of oxygen therapy project but Some technical problem happened in Phalanxay district hospital, because concentrator produced insufficient "quality" oxygen to treat patient, that why one of them dissatisfied the result of treatment by concentrator. In Papua New Guinea showed the improvement of using system using pulse oximetry and concentrators were a high cost effective, better quality of health care and also decrease mortality in developing countries [9].

Two of interviewees were not satisfied because low oxygen flow compare with oxygen cylinder because oxygen deliver from cylinder provided 100%, with high pressure [10]. Oxygen concentrator provided oxygen at the concentration between 90 and 96%, because, it entrained air from the ambience air, which usually contains 21% oxygen, 78% nitrogen and 1% other gases. By extracted nitrogen from the air, they can produce almost pure oxygen (O2=21 x 100%/22= 95%) [10, 11].

The oxygen therapy pilot project was satisfied with all of interviewee and contributed a lot of benefits to hospitals and health care workers included refill cost of oxygen cylinder and reduced worker load to carry and move the heavy cylinder [12].

Walk-through survey

Ten oxygen concentrators set in two district hospitals. Seven concentrators had no big problem; eight concentrators always provided oxygen. The average time of use was 1,165 hours, with maximum 6193 hours, this machine placed in Emergency room in Sepon, the minimum was 98 hours, fixed as mobile machine in Phalanxy, but no reason why it used less than other, may had the problem of the machine or few case admission. Compared to data from 2012, it showed the total 36 oxygen concentrator had been set in 10 district hospitals, 5 provinces and 22(61%) had no major problem, 17(47%) had been regular used and worked without any problem (Amy Gray, 2012). All oxygen sensor and pulse oximetry were in good condition and available for needed in the screening area/reception. In Malawi and Mongolia, the oxygen concentrator had been installed for 48 and 36 months, it was the priority and was a primary source of oxygen. After, assessed concentrators in Malawi (28/36) and Mongolia (13/25) were functioning with up to 30,000 h of use. However some oxygen concentrator were functioning very poorly despite, so, the concentrator was perform variety depend on different brands from variety manufactories but, after years concentrator were still functioning and indicating widespread use but the resource should consider for ongoing maintenance [13].

As observation and ask on oxygen prong cleaning and disinfecting procedure, cleaning and disinfecting as recommend from the procedure was difficult for them to implement, because limit of time and, they only discarded after use or contaminated with blood or secretion. At the beginning of project, it recommended to record time of nasal prong used but it seem to be difficult to monitor as project plan ether.

RECOMMENDATION

Evaluation patients' satisfaction was an important issue to improve the service within health facilities in order to serve health care service to patient seek treatment in that hospital.

District hospital needed to have activities for regularly cleaning the concentrator equipment, oxygen tubing and oxygen outlet, otherwise, problem continually happened and caused malfunctioning to concentrators. Regularly report of problems and situation of concentrator were needed. Data collection considered as important to determine the impact on patient care and outcome of on-going project, without data collection, project could not interpret the result and won't see the benefit of pilot project, if hospital can completed data or information recorded, it might reflect to expand project to other district hospital, this will help to improve health care system in provinces and Laos, but as the district had a limit of health care worker, that why it became to director of district hospital to find the solution to solve this problem.

Project had to continually support other district hospitals; it was priority to project to consider, especially in poor district hospital and far from oxygen refill company but Pilot project had high expenditure, therefore, more donors needed to involve. Hence, Ministry of health might find more donors and coordinate with other agency to support and expand oxygen therapy by concentrator to other poor district hospital by make report and presented pilot project outcome during meeting or conference.

Now a day, satisfaction of patient with care service or health care facility was an important issue to improve health care system in Laos, but it seen that, we still had limitation = to indicate how best health service had provided to patient or care takers, so, MoH had to allocate fund to university of health, health facilities or health institutions to study on patients' satisfaction, also to make policy or regulation to improve satisfaction of health care service.

This study had few sample size, it was only 50 patients' care takers collected during January to April 2014, during that period few patients admitted to the hospital. Therefore, next study had to find out more patients sample size and did more in other district hospital.

The results of this study showed, patients' care takers had the high satisfaction of oxygen therapy but lacking information of association factor that contributed to high satisfaction, so next research instrument, especially questions should evaluate for developing a good questionnaire that support to measure patients' satisfaction [14].

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